FIFTH FIVE-YEAR REVIEW REPORT FOR

LAKE SANDY JO SUPERFUND SITE

Gary, Lake County, Indiana

July 2016

Prepared by
U.S. Environmental Protection Agency
Region 5
Chicago, Illinois

Approved by: **Date:**

J. J. Fa for — 7/14/16

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LIST OF ACRONYMS

EPA	United States Environmental Protection Agency
ERC	Environmental Restrictive Covenant
ESD	Explanation of Significant Differences
GHWC	Gary Hobart Water Company
InAC	Indiana Administrative Code
IC	Institutional Controls
INDOT	Indiana Department of Transportation
IDEM	Indiana Department of Environmental Management
LSJ	Lake Sandy Jo Superfund Site
LTS	Long-Term stewardship
mg/kg	Milligram per kilogram
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation & Maintenance
OM&M	Operation & Maintenance Manual
OU	Operable Unit
ppb	Parts per billion
ppm	Parts per million
RA	Remedial Action
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SDWA	Safe Drinking Water Act
SVOCs	Semi-Volatile Organic Compounds
TCL/TAL	Target Compound List/Target Analyst List
TIC	Tentatively Identified Compound
UU/UE	Unlimited Use/ Unrestricted Exposure
VOCs	Volatile Organic Compounds

EXECUTIVE SUMMARY

This is the fifth Five-Year Review (FYR) for the Lake Sandy Jo (LSJ) Superfund Site (Site) in Gary, Lake County, Indiana (see Appendix C, Figures 1A and 1B). The purpose of this FYR is to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this statutory FYR was the signing of the previous FYR on July 14, 2011.

The Site is at 3615 West 25th Avenue in northern Lake County, Indiana. It encompasses 50 acres in a low-density residential area of Gary, Indiana and is bordered by Interstate 80/94 to the south. The Site is roughly rectangular in shape and is enclosed by a six (6) feet high chain link fence.

The remedy at the Site consists of onsite disposal of excavated sediments, construction of a soil cover over the landfill, installation of a groundwater monitoring system, providing municipal water via extension of water mains to affected residents, and implementation of institutional controls (ICs) on the landfill and aquifer use to ensure that the remedy remains protective in the long-term.

The Site remedy consists of two operable units (OUs). Soil cover and fence construction, sediment excavation and onsite disposal, and monitoring well installation were completed in December 1990 as part of the remedial action for OU1. A permanent vegetative cover with prairie grass was established and maintained. ICs have been implemented consisting of both deed restrictions (generally known as proprietary controls or Environmental Restrictive Covenants (ERCs) in Indiana) and ordinances (known generally as governmental controls).

The only ICs that are not in-place which are needed to ensure long-term protectiveness are the deed restrictions on the Indiana Department of Transportation (INDOT) easement along the highway. However, that does not affect the remedy's short-term protectiveness since access to this parcel is extremely limited being that it is wedged between the landfill and a major highway. Also, there are no known down-gradient uses of the property and the property is covered by a city-wide groundwater restriction ordinance.

The OU2 remedy included providing an alternate water supply to residents likely to be affected by groundwater contamination attributed to the Site. A total of 32 residences were connected to the water supply system. 18 residences chose not to be connected to the water supply system, but were provided with the equipment to make the connection at any time. Also, the levels of groundwater contamination have steadily declined over the years. The OU2 work was completed in September 1994.

The Site reached construction completion with the signing of the Preliminary Close-Out Report in September 1994.

The United States Environmental Protection Agency (EPA) completed FYRs for the Site in 1996, 2001, 2006 and 2011. The assessment conducted for this FYR found that, except for several IC matters which require follow-up, the components of the remedy were implemented in accordance with the requirements of the 1986 Record of Decision (ROD) and the 2008 Explanation of Significant Differences (ESD). The remedy is functioning as anticipated. The immediate threats have been addressed at the Site. The remedy is protective of human health and the environment in the short-term because exposure pathways that could result in unacceptable risks are being controlled and monitored through existing ICs,

site access restrictions, and ongoing operation and maintenance (O&M). Finally, the benzene concentrations in groundwater are either decreasing or stabilizing since the beginning of the groundwater monitoring at the Site and Site-related groundwater contamination can only be detected on or immediately adjacent to the Site. No distinct plume of contamination can be delineated.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Lake Sandy Jo		
EPA ID: IND980500524		
Region: 5	**State:** IN	**City/County:** Gary, Lake County

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): Sheri L. Bianchin
Author affiliation: EPA
Review period: 10/1/2015 – 7/8/2016
Date of site inspection: 10/30/2015
Type of review: Policy
Review number: 5
Triggering action date: July 14, 2011
Due date *(five years after triggering action date)*: July 14, 2016

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
none

Issues and Recommendations Identified in the Five-Year Review:

OU(s): OU1/Sitewide	Issue Category: Institutional Controls			
	Issue: ICs are needed to ensure protectiveness.			
	Recommendation: Continue to work with INDOT to finalize and record an ERC on its parcel; explore working with the City of Gary to possibly enhance the groundwater ordinance or consider other enhancements for both of these ICs.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA/State	12/31/2018

OU(s): OU1/Sitewide	Issue Category: Institutional Controls			
	Issue: Effective ICs must be maintained, monitored and enforced.			
	Recommendation: Amend the O&M Plan to incorporate long-term stewardship (LTS) procedures, which include regular inspections of ICs at the Site and regular certification to EPA that the required ICs are in place and effective.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**

No	Yes	State	EPA/State	12/31/2018

OU(s): OU1/Sitewide	**Issue Category: Site Access/Security**			
	Issue: Fencing not fully intact.			
	Recommendation: Complete fence repairs.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA/State	03/31/2017

Protectiveness Statement(s)

Operable Unit:	*Protectiveness Determination:*
OU1	Short-term Protective

Protectiveness Statement:

The remedy at OU1 for the Site is currently protective of human health and the environment because it is functioning as designed. The landfill is fenced with signs posted and the cap is in good condition. Most of the ICs are in place in the form of both proprietary controls (i.e., Environmental Restrictive Covenants (ERCs)) and governmental controls (i.e., land use and groundwater use ordinances). However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: work with INDOT to finalize and record an ERC on its parcel and explore working with the City of Gary to possibly enhance the groundwater ordinance or consider other IC enhancements for both ICs; amend the O&M Plan to incorporate LTS procedures; and complete fence repair.

Operable Unit:	*Protectiveness Determination:*
OU2	Protective

Protectiveness Statement:

The remedy at OU2 for the LSJ Site is protective of human health and the environment because an alternate water supply was provided or made available to residents likely to be affected by

groundwater contamination attributed to the Site. A total of 32 residences were connected to the water supply system. 18 residences chose not to be connected to the water supply system, but were provided the equipment to make the connection. The water is being monitored by a private utility company in the area, Gary Hobart Water Company, which has agreed to assume ownership and provide O&M for the water supply lines constructed as part of the project. Also, the levels of groundwater contamination have steadily declined over the years.

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The remedy across the Site (i.e., Sitewide remedy) is currently protective of human health and the environment because it is functioning as designed. The landfill is fenced with signs posted and the cap is in good condition. Most of the ICs are in place in the form of both proprietary controls (i.e., ERCs) and governmental controls (i.e., land use and groundwater use ordinances). An alternate water supply was provided or made available to residents likely to be affected by groundwater contamination attributed to the Site. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: work with INDOT to finalize and record an ERC on its parcel and work with the City of Gary to possibly enhance the groundwater ordinance or consider other IC enhancements for both ICs; amend the O&M Plan to incorporate LTS procedures; and complete fence repairs.

I. INTRODUCTION

The purpose of a FYR is to evaluate the implementation and performance of a remedy to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

EPA prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA Section 121 states:

> *"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such reviews are required, the results of all such reviews, and any actions taken as a result of such reviews."*

EPA interpreted this requirement further in the NCP at 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

> *"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action."*

EPA conducted a FYR on the remedy implemented at the Lake Sandy Jo Superfund Site in Gary, Lake County, Indiana. EPA is the lead agency for developing and implementing the remedy for the Site. The Indiana Department of Environmental Management (IDEM), as the support agency representing the State of Indiana, has reviewed all supporting documentation and provided input to EPA during the FYR process.

This review is the fifth (5th) FYR for the Site. The triggering action for this policy review is the date of the signature of the fourth FYR dated July 14, 2011. This review is required because hazardous substances, pollutants, or contaminants are left onsite above levels that allow for unlimited use and unrestricted exposure (UU/UE). The Site consists of two OUs, which are addressed in this FYR report.

II. PROGRESS SINCE THE LAST REVIEW

Table 1 lists the 2011 protectiveness statement for the Site and Table 2 lists the status of recommendations or follow-up actions made in the 2011 FYR report.

Table 1: Protectiveness Determination/Statement from the 2011 FYR report

OU #	Protectiveness Determination	Protectiveness Statement
01 /02 (Sitewide)	Short-term Protective	The remedial actions for OU-1 and OU-2 are currently protective of human health and the environment in the short-term. However, because the required ICs have not been implemented, the Site is not protective of human health and the environment in the long-term. The LSJ site is currently protective of human health and the environment in the short-term. Once the restrictive covenants are filed and groundwater ordinance modified, the remedy will be considered protective of human health and the environment in both short-term and long-term.

Table 2: Status of Recommendations from the 2011 FYR

OU #	Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Party	Original Milestone Date	Current Status	Completion Date (if applicable)
OU1/ OU2/ Site-wide	In order for the remedy to be protective in the long-term, effective institutional controls must be implemented and maintained.	• Ensure that environmental covenants are recorded for remaining properties at the Site • Request an additional groundwater ordinance to be put into place to restrict all groundwater use in both on-Site and off-Site areas affected by the remedial action.	State/EPA	EPA/State	July 2012	On-going	

Recommendation: This recommended action is on-going. EPA completed the title commitment in January 2012. Fifty-six (56) additional ERCs were implemented in 2012 and 2013. The current monitoring data shows that groundwater contaminant concentrations in groundwater are either decreasing or have stabilized since the beginning of the groundwater monitoring at the Site and Site-related groundwater contamination can only be detected on or adjacent to the Site. No distinct plume of contamination can be delineated. The groundwater contaminants remain contained within the Site boundaries except for some detections near the southeast perimeter of the Site which are likely caused by another source. The entire city is covered by a groundwater restriction ordinance. EPA and IDEM will explore working with the City of Gary to further enhance the ordinance or consider other enhancements. An IC still needs to be completed on an easement near the highway which is owned by INDOT. This is further discussed under Institutional Controls.

Remedy Implementation Activities

Since the last FYR, ERCs have been implemented on fifty-six (56) parcels and the groundwater ordinance has been amended. EPA and IDEM undertook no other significant remedial action activities at the Site since the previous FYR. Previous remedy implementation activities are discussed in Appendix A.

Institutional Controls

ICs are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for exposure to contamination and that protect the integrity of the remedy. ICs are required to assure long-term protectiveness for any areas which do not allow for UU/UE and ensure no inappropriate land and groundwater uses occur and maintain the integrity of the remedy. The requirement for ICs in the ROD serves as a protectiveness measure to be used in concert with the containment remedy. A general summary of the implemented ICs for the Site is listed in Table 3 and ICs are further discussed below. Copies of ICs that have been implemented are found in EPA's records. A map showing the area in which the ICs apply is included in Appendix D.

Table 3: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)

Lake Sandy Jo Landfill Property (On Site) – Area which contains waste material (interpreted as the area occupied by the former landfill, not the currently fenced boundary)	Yes	Yes	60 parcels See maps in Appendix D	Prohibit future use that is incompatible with remedial actions in place including residential use. Allow for recreational use or commercial use on the 40-acre property, with prior notification to and approval from EPA and IDEM. Prevent installation of wells into aquifer (except for monitoring). Prohibit interference with remedy. Ensure proper maintenance of the cap and fencing.	-Environmental Restrictive Covenants (Completed; See Appendix D) -Town Ordinance regulating groundwater uses: Titled "Amended Groundwater Ordinance Restricting Usage" #2006-567930 and dated 9/27/07 -Town Zoning Ordinances – allows for Commercial /Industrial uses
INDOT Property adjacent to Lake Sandy Jo Site.	Yes	Yes	One parcel- See maps in Appendix D	Same as above	-Environmental Restrictive Covenants (Planned) -City Ordinance regulating groundwater uses. Titled "Amended Groundwater Ordinance Restricting Usage" #2006-567930 and dated 9/27/07
Groundwater; On and off Lake Sandy Jo Property;	Yes	Yes	See maps in Appendix D	Prevent use of groundwater or installation of wells into shallow aquifer (except for monitoring).	-City Ordinance regulating groundwater uses. Titled "Amended Groundwater Ordinance Restricting Usage" #2006-

					567930 and dated 9/27/07

ICs Which Are Required By the Decision Documents

EPA issued a ROD for the Site on September 26, 1986 which documented the selected remedy. One of the major components of the selected remedy included placement of deed restrictions on the landfill property and ICs prohibiting groundwater use.

The ROD states: the remedial action includes "deed restrictions on landfill property and institutional controls on aquifer use." It also states that deed restrictions will be placed on the landfill property to prevent future development of the land, to protect against direct contact with contaminants or further migration of contaminants that would result from Site excavation. Institutional controls will also prohibit use of ground water or installation of shallow wells on-Site and in the area provided municipal water and an area north of the landfill.[1]

Based on the reuse study discussed below, the ESD issued in October 2008 modified the end use of the Site to allow for certain types of uses such as recreational or limited commercial[2]. The developer will pay for any technical evaluations which need to be conducted of the cap and for any site-engineering costs to allow for recreational/limited commercial use. Developers' and/or owners' plans for reuse must be submitted to both EPA and IDEM for approval. Owners must ensure the integrity of the cap is maintained, to avoid future liability costs.

The ESD also suggested that a separate groundwater ordinance may be necessary to enhance the protectiveness. The ESD stated the following: A separate ground water ordinance will be implemented by the City of Gary for the area bounded by 23rd Avenue to the north, Morton Street to the west and Waite Street to the east and by 28th Avenue to the south. The ground water ordinance will prohibit any installation of wells, regardless of use, and close any existing potable wells. The ordinance or another mechanism will also close any non-potable wells.

Deed Restrictions to Control Land and Groundwater Use at the Landfill Property

As of 2001, the Site covered property owned by 14 different parties, including the City of Gary. Three landowners, including the City of Gary, recorded restrictive covenants on their properties. On August 21, 2001, IDEM received a default judgment against the remaining 11 landowners to compel them to file restrictive covenants that prohibited residential land use and usage of affected ground water. If any landowner failed to execute and record a restrictive covenant within 60 days, IDEM was authorized to file the necessary restrictive covenants.

IDEM did not file any restrictive covenants on behalf of the landowners pending the outcome of a redevelopment study on four Superfund sites in Gary, Indiana, conducted by EPA. Preliminary findings of the redevelopment study concluded that the Site had the greatest reuse potential of the four sites examined, due to its location. The study included a few broad descriptions of

[1] Referring to Figure 5 of the ROD

[2] EPA is under no statutory authority to conduct additional work on the Site but is willing to allow the local community to explore reuse opportunities

potential recreational and commercial use. These preliminary findings resulted in local officials expressing interest in reuse opportunities for the Site.

In 2008, EPA tasked its contractor, GRB, to conduct title work and prepare a final current ownership report. A revised final report was issued on February 9, 2009. At that time, 46 parcels of land were identified within the landfill area. However, 60 parcels were identified as needing deed restrictions. Those are identified as the following parcel identification numbers: 41-49-0401-0001 to 41-49-0401-0018; 41-49-395-0001 to 41-49-395-1140 and 41-49-008-0001 to 0002.

ICs for Ground Water

The 1986 ROD did not describe the type of ICs for groundwater and did not delineate the exact location where they were required. Presumably, it was envisioned that the groundwater ICs would prevent use of contaminated water, and that groundwater uses would be regulated near the Site so the contaminated water would not be pumped to areas off-Site.

On July 3, 2006, the City of Gary implemented a citywide ordinance titled "Amended Groundwater Ordinance Restricting Usage" #2006-567930 and dated 9/27/07. That ordinance allows the City to regulate ground water usage. This ordinance prohibits the installation of wells for potable water and requires current potable-use well owners to connect to municipal water if available in their area. If not available, the owners are required to draw from a deeper confined aquifer. All existing potable-use wells have to be tested to ensure that the water meets drinking water standards and be registered with the city. Wells for non-potable use are allowed and must first be registered with the city.

However, as discussed in the last FYR and the 2008 ESD, since the ordinance does not deny installation of non-potable use wells, including wells for high-volume industrial use, consideration should be given to updating the ordinance to require that the City can prohibit wells for non-potable uses if it might result in direct contact with the contaminated groundwater and/or might cause migration of the contaminants.

Based on the current groundwater monitoring data, it appears that this measure may not be necessary to ensure long-term protectiveness since the groundwater results indicate that Site-related contamination in groundwater has declined and it appears to be isolated to the southeastern portion of the Site. EPA also believes that the benzene detections adjacent to the Site may be due to the adjacent junk yard (See Figures 4A and 4B in Appendix C showing plume map from the ROD and compare to map showing results of recent groundwater monitoring). Although updating the ordinance can enhance the remedy, this measure appears to be unnecessary for long-term protectiveness.

Current Status of Use Restrictions and ICs

As part of the remedy, ICs to restrict land and groundwater use restrictions are required.

An IC map has been developed (See Appendix D - Institutional Control (IC) Review Map) and will be updated. As mentioned, the ROD required ICs be put in place by placing deed restrictions (known as environmental covenants in Indiana) to prevent future development of the land, prohibiting the use of groundwater or installation of shallow wells on-Site in the area provided municipal water and an area north of the Site. Besides one parcel on the INDOT easement, this has been completed. The ROD also required access to the Site be restricted by use of a fence which has been in place since 1990.

On August 21, 2001, IDEM received a default judgment against the 11 landowners who did not file restrictive covenants. The Court entered a declaratory judgment against the 11 landowners:

1. Prohibiting residential use of the Site.

2. Prohibiting the use of groundwater underlying the Site in any manner which would endanger human health or the environment.

3. Prohibiting excavation, installation, construction, removal or use of any buildings, wells, pipes, roads, or ditches without written permission of EPA and IDEM.

The court further compelled each Defendant to within 60 days execute and record a restrictive covenant prohibiting activities which might expose humans to the hazardous substances still remaining beneath the Site. If any landowner failed to record the required restrictions, IDEM was authorized to file the restrictions on behalf of that landowner. None of the landowners filed the necessary restrictive covenants. IDEM did not immediately file any restrictive covenants on behalf of the landowners, because it was waiting for the results of a redevelopment study conducted by EPA which is discussed further below.

In 2002, EPA funded a grant to assist the City of Gary with reuse planning at four NPL sites under the Superfund Redevelopment Initiative. The Site was one of the sites chosen for a redevelopment study. Preliminary results concluded that the Site had the greatest reuse potential of the four sites, due to its location. The redevelopment study mentioned a few broad descriptions for recreational and commercial use.

Local officials expressed interest in reuse opportunities for the site. In 2008, EPA modified the remedy with an ESD that allowed for limited recreational and commercial development on the site and thus the ICs were modified accordingly. In January 2011, IDEM obtained current deeds on the properties from the Lake County Recorder's Office.

Through an extensive review, IDEM has been able to identify the current names of the parcel owners located within and adjacent to the Site. IDEM sent letters to the parcel owners requesting them to file ERCs according to Indiana law. To date, all required ERCs have been implemented except the ERC on the easement along the highway which is discussed below.

Since the last FYR, EPA and IDEM have been working through the process of obtaining the necessary ERCs for the numerous parcels. ERCs have been implemented for an additional fifty six (56) parcels. Those ERCs prevent inappropriate uses of the land and groundwater. It is

believed that all ICs are in place except ICs on the parcel owned by the INDOT located south of the Site. The parcel is in the easement of the Interstate 80/94 belonging to the INDOT.

IDEM has contacted and met with local INDOT officials in the Gary District Office. IDEM and INDOT discussed the request for INDOT to institute an ERC on the property, which is outside the fence but within the right-of-way which is under the jurisdiction of INDOT. IDEM sent the drafted ERC to INDOT for INDOT's review and signature. To date, INDOT has not returned the signed ERC.

EPA still believes that an ERC is needed on that property, to protect the monitoring wells and prevent use of the contaminated groundwater outside the fence. So far, INDOT has not filed the ERC. However, access to this parcel is extremely limited since the land area is wedged between the landfill and a major highway. Also, there are no known down-gradient uses of the property, and the property is covered by the city-wide groundwater restriction ordinance.

Current Compliance

Based on the recent Site inspection and current data, EPA observed no inappropriate land or groundwater uses. EPA is not aware of site or media uses which are inconsistent with the stated objectives of the ICs and cleanup goals. Access to the property is further restricted by the use of fencing. Although the fencing was not fully intact during the FYR inspection, part of it has been repaired and the remaining fence damage is scheduled to be repaired. Long-term protectiveness at the Site also requires continued compliance with use restrictions to assure that the remedy continues to function as intended.

Long-Term Stewardship

Long-term protectiveness at the Site requires compliance with use restrictions embodied in effective ICs to ensure the remedy continues to function as intended. Compliance with effective ICs will be ensured by implementing, maintaining, monitoring and enforcing effective ICs as well as maintaining the Site remedy components. To assure proper maintenance, monitoring, and enforcement of effective ICs, long-term stewardship (LTS) procedures are needed. EPA and IDEM will develop an amendment to the O&M plan to add LTS procedures, including a provision for regular inspections and an annual analysis of whether ICs at the Site are in-place and effective. EPA, with the assistance of IDEM, will also explore use of a communication plan and use of the one-call system.

System Operation/Operation and Maintenance Activities

IDEM has contracted Keramida, Inc. for performance of O&M at the Site. The work is being conducted under EPA and IDEM oversight and in accordance with the current O&M Manual dated August 1996, as modified in 2004.

The required tasks for the Semi-Annual Events include:

- clearing vegetation along the fence-line
- inspecting the fence-line
- mowing the Site
- sampling selected monitoring wells

In late 2015, EPA has approved a further reduction in groundwater monitoring. See discussion below.

Also, for OU2, 32 residences were connected to the municipal water supply system. 18 residences chose not to be connected to the water supply system, but were provided the equipment to make the connection[3]. A private utility company in the area, Gary Hobart Water Company, agreed to assume ownership and provide O&M for the water supply lines constructed as part of the project. Also, the levels of groundwater contamination have steadily declined over the years.

III. FIVE-YEAR REVIEW PROCESS

Administrative Components

This FYR was led by Sheri L. Bianchin, EPA, Remedial Project Manager (RPM) for the Site. Prabhaka Kasarabada and Justin Hodgson, IDEM, assisted in the review as the representatives for the support agency.

The review, which began on September 1, 2015, consisted of the following components:

- Community Notification and Involvement
- Document Review
- Data Review
- Site Inspection
- FYR Development and Review

Site Inspection

The Site inspection for this review was conducted on October 30, 2015 and was led by Sheri Bianchin of EPA. Sheri Bianchin and Tom Bloom of EPA and Prabhakar Kasarabada of IDEM were present during this inspection. The FYR site inspection checklist was used as a guideline for the Site inspection. See Attachment E.

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[3] The ROD (1986) states that "… twenty-nine (29) residential well samples were collected from wells located southeast and along the drainage ditch leading south from the Site and the groundwater quality was seriously degraded; however, none of these contaminants have primary drinking water standards. These low level inorganic contaminants in conjunction with high dissolved solids are a direct result of the landfill leachate and constitute a non-toxic ground-water plume."

"Organic contaminants have not been detected in residential wells. However, through the inorganic data, the ground-water pathway is clear. Therefore, the potential exists for exposure to ground-water users of yet undetected contaminants or increased levels of inorganic contaminants."

"None of the residential wells sampled contained benzene; however, benzene was found in some of the monitoring wells exceeding 10 ^-6 (1ppb). Therefore, shallow aquifer groundwater may pose a cancer risk due to the presence of benzene in the future."

The participants walked around the surface of the Site to observe the conditions at the cap. The participants also drove around the Site to observe the wells not located around the immediate site boundary and to note conditions of the surrounding neighborhood.

The Site was in good condition. The parties observed no breaches to the landfill cap and the cap remained predominantly vegetated. While portions of the fencing surrounding the Site were in disrepair, some of the fencing has been repaired and the other areas are scheduled to be repaired. The Site gates were locked.

Interviews

The general community has not expressed interest in the Site during this FYR period. As a result, EPA conducted no formal interviews. However, several developers have approached EPA and IDEM looking into whether the Site can be used for redevelopment. Discussion has occurred on and off since the last FYR.

Community Notification and Involvement

EPA published a notice in the local newspaper, the Times Northwest Indiana newspaper (nwi.com), on December 23, 2015 (see Appendix B), stating that EPA was conducting a FYR and inviting the public to submit any comments to EPA. EPA will make the FYR report available in EPA's files and on EPA's website. EPA will also place the completed FYR report in the Site information repository at the Library.

Document Review

This FYR consisted of a review of relevant documents including the ROD, the ESD, and the semi-annual inspection reports including the groundwater sampling data results.

Data Review

IDEM and its contractor, Keramida, Inc., have been conducting O&M activities at this Site since late 1993. Currently work is occurring per the Final Operation and Maintenance Manual (O&MM) dated April 1996[4]. O&M began after completion of the remedy construction by EPA. Keramida, Inc. has been conducting site inspections and groundwater monitoring on a semi-annual basis. Keramida submits "Semi-Annual Monitoring Reports" which document the semi-annual inspections and groundwater monitoring results (See most recent semi-annual report, dated December 2015, in Appendix F).

Currently, all O&M activities are conducted under the Final O&MM dated April 1996 which has been modified on several occasions. The 1996 O&MM prescribed quarterly sampling of the groundwater monitoring wells with the ability to change the frequency of the sampling as needed. In 2004, IDEM conducted a more in-depth evaluation of the past 10 years of quarterly data for the Site. Based on the analysis, the sampling frequency was reduced from quarterly to semi-annually in September 2004.

IDEM staff conducted quarterly sampling from 1993 through 2004. The analytical parameters included metals, semi volatile organic compounds (SVOCs) and volatile organic compounds

[4] The sampling frequency was reduced to semi-annual in 2004.

(VOCs). With the stabilizing of benzene levels in the majority of the wells and the other contaminants remaining below action levels, the decrease in monitoring frequency was approved by EPA provided that wells of concern located in the southeastern portion of the Site were sampled during each event. In 2015 EPA approved reducing the sampling frequency further, from semi-annually to annually which will begin in 2017.

Monitoring wells of concern are along the southeast perimeter of the Site. These wells are MW-05, MW-06, MW-14 and MW-15. See map showing well locations as Figures 2A and 2B in Appendix C. Groundwater monitoring results from 2015 are presented on Table 4.

Table 4- VOCs Results (µg/L) from 2015 Semi-Annual Sampling Event for Select Wells

Wells		MW-5	MW-6	MW-9	MW-10	MW-14	MW-15	MW-16	MW-23R	MW-27
Contaminant of Concern / Date Well Was Sampled	MCL									
Acetone	NE									
May 2015										
September 2015		12/ ND	6.6			12				
Benzene	5									
May 2015		4.4				**21.4/22.3**	**20.7**			
September 2015		**53 / 53**	2.2			**24**	**22**			
Chlorobenzene	100									
May 2015										
September 2015		0.76J/ND					15			
Chloroethane	NE									
May 2015		4.5				16.3/15.4	15			
September 2015		3.6/3.6					13			
Isopropylbenzene	NE									
May 2015						ND	ND			
September 2015		ND/ND	1.1				ND			
Toluene	1000									
May 2015										
September 2015		2.2/2.2	0.74				ND			
Xylenes	10000									

May 2015		1.4				ND	ND			
September 2015		1.5/2.7					0.74			
Other VOCs										
May 2015			ND	ND	ND				ND	ND
September 2015			ND	ND	ND					ND

ND= Non-Detect NE = Not Established Highlighted results exceed the MCL; A second result shown is a duplicate sample.

A map of these results appears in Figures 4A and 4B in Appendix C.

Keramida, IDEM's contractor, has been conducting ground water sampling on a semi-annual basis since 2004 through the present under the direction of IDEM. The current monitoring program is as follows. Keramida samples eight (8) or nine (9) MWs consisting of MW-2, MW-5, MW-6, MW-9, MW-10, MW-14, MW-15, MW-23R, & MW-27, twice per year using low-flow sampling methodology. Keramida measures the groundwater levels and general water quality parameters, including temperature, pH, specific conductivity, and turbidity.

Analytical parameters which are tested include metals, VOCs, and SVOCs. Overall, the results are consistent with previous results. Groundwater flows south in the area (See Figure 3 in Appendix C). Benzene is the primary contaminant of concern (COC) detected at this site. Also, several other VOCs and SVOCs continue to be detected at low levels. Specific results from the spring and fall 2015 semi-annual monitoring events are shown in Appendix F.

Most on-site monitoring wells have been non-detect (ND) in the recent past and continue to be ND in 2015. Benzene concentrations have been detected above the Maximum Contaminant Levels (MCLs) of 5 micrograms per liter (ug/l) only in wells, MW-05, MW-06, MW-14 and MW-15, located on and at the southeast border of the Site. In September 2015, the benzene concentration was 53 µg/l in MW-5; 24µg/l in MW-14; and 22 µg/l in MW-15 which exceeded the MCL. In May 2015, the wells where the benzene concentration exceeded the MCL were MW-14 (21.4 µg/l) and in MW-15 (21.4 µg/l).

The other compounds detected were acetone, chlorobenzene, chloroethane, isopropylbenzene, toluene, and xylenes, and either do not have an MCL, or did not exceed the established MCL. Also, acetone is often a laboratory artifact. Since the last FYR, other COCs have been detected which include vinyl chloride (VC), trichloroethene (TCE), and 1,2-DCE; however, those COCs were not detected in the last year.

A semi-active junk yard, which may be a source for benzene, has been noted in the vicinity of these four (4) wells (i.e., MW-05, M-06, MW-14 and MW-15). Google Earth images of the landfill and the junk yard show a history of trailers and other debris residing at the junk yard, particularly in 2003, and images show that the junk yard is apparently "well-established" in more recent years since 2012.

In 2015, IDEM's technical staff conducted a trend analysis on benzene concentrations. IDEM used the EPA ProUCL tool to perform the Mann-Kendall trend analysis on benzene concentrations in monitoring wells for which adequate data was available during the period 2006-2015 (last 10 years). IDEM conducted the trend analysis on the off-site wells MW-05, MW-06 and MW-15, which are in the adjacent junk yard southeast of the Site. (See Mann-

Kenndall output graphs depicted in Figures 6 A – C in Appendix C). Of those wells, only MW-06 showed statistically significant evidence of a decreasing trend at the 95% confidence level using the Mann-Kendall trend analysis (see attachments for trend graph, test output data, and input data in Appendix F). All other wells do not show any significant trend.

In conclusion, the Site-related contaminant concentrations such as benzene are either decreasing or have stabilized since the beginning of the groundwater monitoring at the Site. While only well MW-06 showed a significant decreasing trend, all four monitoring wells (i.e., MW-05, M-06, MW-14 and MW-15) with a significant number of benzene detections are located either within or down-gradient of the junk yard. During a Site visit in August 2015, IDEM staff noted that multiple potential sources for the benzene contamination are present in the junk yard, such as body parts from abandoned trucks, etc. It is not uncommon to find benzene, ethylbenzene, toluene or xylene (i.e., known as BETX) contamination coming from junk yards, due to leaking gasoline from the abandoned vehicles. Further, it is not uncommon to find solvent contamination on the ground and in the groundwater when automotive parts are removed from a vehicle and cleaned with solvent prior to reuse.

Based on the visual observations, the groundwater flow pattern, and the distribution of the benzene contamination, it is likely that the benzene detections in wells MW-05, MW-06, MW-14, and MW-15 are attributable to the junk yard and not related to the Site. However, the Site may still be contributing to the groundwater contamination due to the presence of other COCs which are occasionally detected.

Based on the relatively low concentrations and limited extent of the benzene contamination, and the likelihood that the contamination is originating from the junk yard, and also based on the fact that there are no receptors down-gradient of the Site, IDEM staff proposed to EPA to reduce the groundwater sampling frequency. Based on those factors, EPA has approved a further reduction in sampling frequency from semi-annual to annual starting in 2017. IDEM and EPA will continue to evaluate the data to determine if the contamination detected near the southeast corner of the landfill is due to the adjacent junk yard.

General Summary

The review found that the cleanup and containment remedy is operating as designed and is protective of human health and the environment in the short-term. Data reviewed from 2011 to 2015 indicate that the concentrations of contamination in the groundwater are declining, with benzene being the primary COC. Other potential COCs are chlorobenzene, chloroethane, isopropylbenzene, toluene and xylenes. While some contaminant levels have shown variability, generally, no upward trends exist. Many wells show decreasing concentration trends. While some Site-related contaminants have been found outside the landfill property in the southeast corner, it is likely that the benzene is due to other sources.

IV. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?
Answer: Yes

Remedial Action Performance

The remedial construction activities have been completed, and O&M activities are occurring.

The remedial action was constructed in accordance with the requirements of the ROD, as modified by the ESD.

The Site was in good condition. No breaches to the landfill cap were observed and the cap remained predominantly vegetated. Although the gate was locked, several areas of the boundary fencing were not intact. See the Site Inspection Report contained in Appendix E. Since that time, some of the fencing has been repaired. The fence repairs this year included the recently damaged portion along W. 25th Ave along the northern boundary which was completed on 5/11/2016. Remaining tasks to be completed this summer are the fence repairs in the northeastern portion of the Site along the neighboring property and the portion in the northwestern portion near the wooded area. The fence along Jennings Street will need to be repaired in the near future as well, however, that will likely need to wait until the next grant year cycle. See photos in Appendix E. IDEM staff will continue to inspect the fence and Site, and mow the site semi-annually or on an as needed basis.

Monitoring data show that the contaminant concentrations continue to decrease, in general, and are contained within the site boundaries. While some site-related contaminants have been found outside the landfill property in the southeast corner, it is likely that that the benzene is due to other sources However, concentrations of benzene can be found in some wells on-Site and near the southern border and eastern border of the Site.

ICs are in place to restrict the use of groundwater as a drinking water source, limit use of the Site and protect the components of the remedy. O&M and monitoring will continue at the Site.

System Operations/O&M Activities

O&M of the soil cover and drainage features has been effective. Groundwater data has shown that contaminant concentrations continue to drop and natural attenuation may be effectively controlling contaminant concentrations within the aquifer beneath the site and off-site.

Current costs at the Site are primarily attributable to operation, maintenance and management of the Site and groundwater monitoring systems. Based on the review of the semi-annual reports provided by Keramida, Inc., contractor for IDEM, and observations made during the Site inspection, it appears the remedy is functioning as designed.

Opportunities for Optimization

Besides reducing the groundwater monitoring frequency, EPA identified no other opportunities for optimization as part of the FYR. However, discussions are continuing regarding exploring possible redevelopment opportunities which could lead to optimization of the remedy.

Early Indicators of Potential Issues

EPA has identified no potential future protectiveness issues.

Implementation of Institutional Controls and Other Measures

All of the required ICs are in-place except on the parcel owned by INDOT, the portion outside the fence along the highway. IDEM drafted an ERC to cover this parcel and sent it to INDOT for their review and signature. INDOT has not yet signed the ERC. EPA and IDEM will continue to

work with INDOT for the completion of this ERC. If INDOT refuses to sign the ERC, then EPA and IDEM will explore other options.

Additionally, although the groundwater ordinance regulates future well installations for potable purposes, it does not prohibit wells for non-potable purposes. The ordinance only requires the City to receive notice of any new non-potable well. EPA will work with the City of Gary to determine if the City is willing to update the groundwater ordinance to prevent non-potable groundwater wells being installed which might disturb the contaminated ground water. While this measure is not necessary to ensure long-term protectiveness since the groundwater plume has receded in that contaminant concentrations continue to decrease, in general, and are contained within the Site boundaries, such an ordinance provision would enhance the already protective remedy. If the ordinance cannot be amended, then EPA and IDEM will explore other options.

Monitoring data show that contaminant concentrations continue to decrease, in general, and are contained within the Site boundaries. However, concentrations of benzene can be found in some wells on-Site and near the southern and eastern border of the Site.

Overall, based on the Site inspection and data, EPA has observed no inappropriate land or groundwater uses nor is aware of uses of the Site or any media such as groundwater which are inconsistent with the stated objectives of the ICs and cleanup goals. Last, IDEM, with input from EPA, will update the O&M plan will be updated to include LTS procedures.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?
Answer: Yes

Changes in Standards and To-Be-Considered Requirements (TBCs)

Standards outlined in the ROD and ESD are still valid at the Site. There have been no changes in remedial action objectives affecting the protectiveness of the remedy.

Changes in Exposure Pathways

No changes in exposure pathways were identified during the FYR.

Changes in Toxicity and Other Contaminant Characteristics

No changes in toxicity or other contaminant characteristics that could affect the protectiveness of the remedy were identified during the FYR.

Changes in Risk Assessment Methods

No changes in risk assessment methodologies that could affect the protectiveness of the remedy were identified during the FYR.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?
Answer: No

No other information has become available that could question the protectiveness of the remedy.

Technical Assessment Summary

This FYR found that the remedy is functioning as intended by the ROD, as modified by the ESD. All ICs have been implemented except the required IC on the INDOT property; however, the remedy is determined to be protective of human health and the environment in the short-term. The standards, exposure pathways, toxicity factors for contaminants of concern, and risk assessment methodologies remain unchanged since the last FYR. There is no other information that calls into question the protectiveness of the remedy.

V. ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 5: Issues and Recommendations/Follow-up Actions

Issues and Recommendations Identified in the Five-Year Review:

OU(s): OU1/Sitewide	**Issue Category: Institutional Controls**			
	Issue: ICs are needed to ensure protectiveness.			
	Recommendation: Continue to work with INDOT to finalize and record an ERC on its parcel and explore working with the City of Gary to modify the groundwater ordinance to enhance it or consider other IC enhancements to ensure long-term protectiveness.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA/State	12/31/2018

OU(s): OU1/Sitewide	**Issue Category: Institutional Controls**			
	Issue: Effective ICs must be maintained, monitored and enforced.			
	Recommendation: Amend the O&M Plan to incorporate LTS procedures, which include regular inspections of ICs at the Site and regular certification that required ICs are in place and effective.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**

No	Yes	State	EPA/State	12/31/2018

OU(s): OU1/Sitewide	**Issue Category: Site Access/Security**			
	Issue: Fencing not fully intact.			
	Recommendation: Complete fence repairs.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA/State	03/31/2017

VI. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)

Operable Unit:	*Protectiveness Determination:*
OU1	Short-term Protective

Protectiveness Statement:

The remedy at OU1 for the Site is currently protective of human health and the environment because it is functioning as designed. The landfill is fenced with signs posted and the cap is in good condition. Most of the ICs are in place in the form of both proprietary controls (i.e., in the form of ERCs) and governmental controls (i.e., in the form of land use and groundwater use ordinances). However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: work with INDOT to finalize and record an ERC on their parcel; work with the City of Gary to modify the groundwater ordinance; amend the O&M Plan to incorporate LTS procedures; and complete fence repairs.

Operable Unit:	*Protectiveness Determination:*
OU2	Protective

Protectiveness Statement:
The remedy at OU2 for the Site is protective of human health and the environment because an alternate water supply was provided or made available to residents likely to be affected by groundwater contamination attributed to the Site. A total of 32 residences were connected to the water supply system. 18 residences chose not to be connected to the water supply system; however, those properties were provided with the equipment to make the connection at any time. The water is being monitored by a private utility company in the area, GHWC, which has agreed to assume ownership and provide O&M for the water supply lines constructed as part of the project. Also, the levels of groundwater contamination have steadily declined over the years.

Sitewide Protectiveness Statement

Protectiveness Determination:

Short-term Protective

Protectiveness Statement:

The remedy across the Site (i.e., Sitewide remedy) is currently protective of human health and the environment because it is functioning as designed. The landfill is fenced with signs posted and the cap is in good condition. Most of the ICs are in place, in the form of both proprietary controls (i.e., in the form of ERCs) and governmental controls (i.e., in the form of land use and groundwater use ordinances). An alternate water supply was provided or made available to residents likely to be affected by groundwater contamination attributed to the Site. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: work with INDOT to finalize and record an ERC on its parcel; work with the City of Gary to modify the groundwater ordinance; amend the O&M Plan to incorporate LTS procedures; and complete fence repairs.

VII. NEXT REVIEW

The next FYR for the Lake Sandy Jo Site is due five years from the signature date of this review.